SCC1300 GYRO-COMBO DEMO KIT
User Manual

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1 Introduction

SCC1300 demo demonstrates the SCC1300 component functionality and the component key properties. This document describes how to install the required software and how to use the SCC1300 demo board and Graphical User Interface (GUI) software.

SCC1300 demo consists of:

- SCC1300 sensor soldered on a chip carrier PWB (see Figure 1 on next page)
- USB interface card (see Figure 1 on next page)
- USB cable
- GUI software running on PC

SCC1300 demo runs on recent Windows versions (Windows 7, Vista, XP and 2000) and it requires USB connection for data transfer. Demo is powered from USB port. The SCC1300 demo is based on the same USB hardware PCB as the SCA3000 Demo Kit, however please note that the original SCA3000 Demo PCB is not compatible with SCC1300. The same USB driver can be used with all demo kits provided by VTI Technologies.

2 Quick Start for Using the SCC1300 Demo Kit

Please follow the steps below:

1. Insert CD-ROM
2. Setup the hardware
   - Connect the demo kit to PC's USB port
3. Install the USB driver, after the PC has found the device
   - Let Windows to install the USB driver, if the driver is not found an executable installer can be run from folder `"CD-ROM\SCC1300 demo - Virtual Com Port Drivers\"`
   - NOTICE, if you have already installed some other demo kit provided by VTI Technologies, please check that the latency timer parameter is 5 ms. In case the latency timer value is greater than 5 ms, the SCC1300 Demo Kit GUI will not work (more detailed instructions in section 8)
4. Install the GUI software
   - Install the GUI software by running the "`setup.exe`" from folder: `CD-ROM\SCC1300 demo – GUI Installer`
   - Do not change the installation destination
5. Start the GUI software
   - From Start → Programs → SCC1300-USB-DEMO-VER-1.0 → SCC1300-USB-DEMO-VER-1.0

When using the SCC1300 Demo Kit with GUI software:

- The Demo Kit should be connected to PC before the GUI software is started
- Exit the GUI software before unplugging the Demo Kit from PC
- After GUI software is stopped, the Demo Kit can be unplugged from PC (Demo Kit uses virtual serial port driver, so it can not be found as a USB device).

During software start up, the firewall may alert that the demo software wants a network access. The demo software can be operated without the network access (granting the network access will not change the software operation).

3 Hardware

The SCC1300 Demo Kit USB interface board (black PWB) and SCC1300 PWB (green PWB) are shown in Figure 1. The USB interface card converts the USB interface to SPI interface. SCC1300 sensor is soldered on PWB which is connected to interface board.

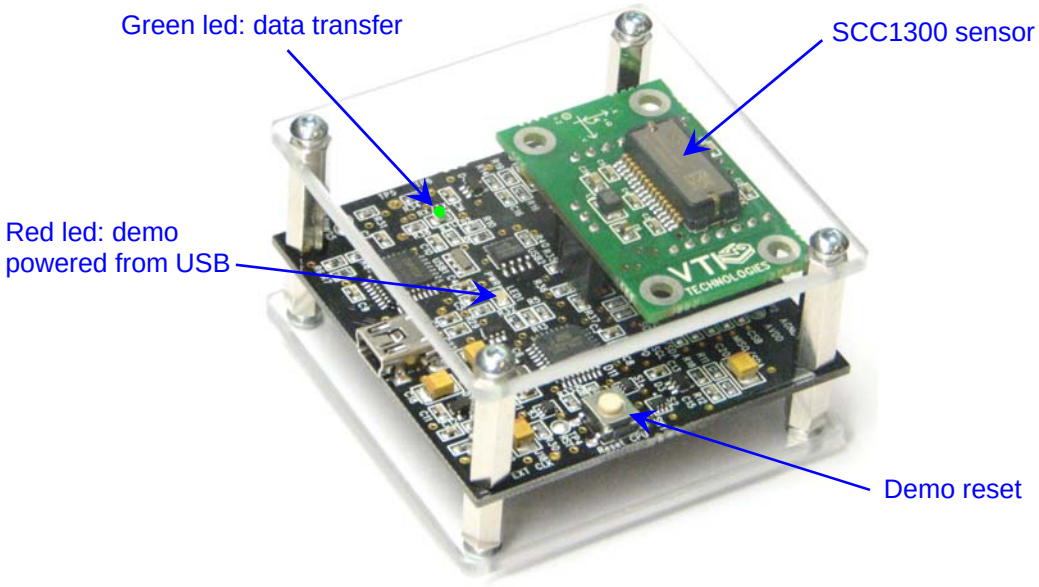


Figure 1. SCC1300 demo USB interface board and SCC1300 PWB.

4 GUI Software

SCC1300 Demo Kit is controlled via USB serial port by GUI software.

The GUI software has three different display modes. The SCC1300 sensor can be set to:

- Gyro & ACC: both gyro and accelerometer data is shown
- Gyro: only gyro data is shown
- ACC: only accelerometer data is shown

The three different GUI displays and start up screens are presented on the following pages.

Screen capture of the GUI is presented in Figure **2**.

Figure 2. SCC1300 Demo Kit Graphical User Interface

Table 1. The numbered items in Figure 2.

Item	Description
1	Exit software, [Esc]-button also.
2	Pull down menu for acceleration [g] range
3	Manual acceleration range selections (Manual setting has to be selected from Range [g] pulldown menu)
4	Pull down menu for angular rate [°/s] range
5	Manual angular rate range selections (Manual setting has to be selected from Range [°/s] pulldown menu)
6	Current acceleration output value decimal display
7	Accelerometer scrolling display
8	Open / close the window extension with arrow button
9	Current angular rate output value decimal display
10	Gyro scrolling display
11	Pull down menu for GUI display mode
12	Display update delay
13	GUI software version number

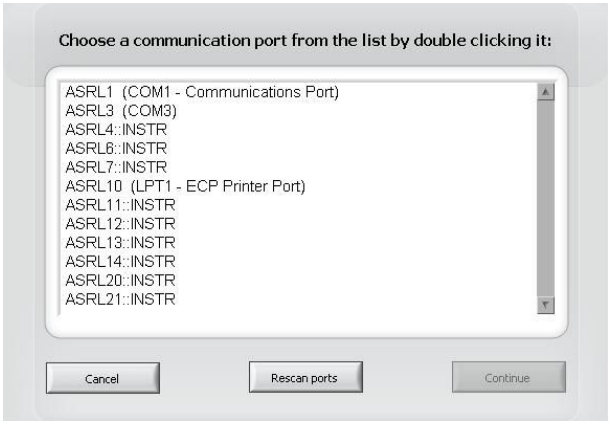


Figure 3. USB serial port selection pop-up window.

If more than one USB serial port devices are connected to PC, user must select the correct **USB SERIAL PORT** from pop-up window (Figure 3). If user does not know the correct USB serial port number, please disconnect all other USB serial port devices from PC and restart the GUI software.

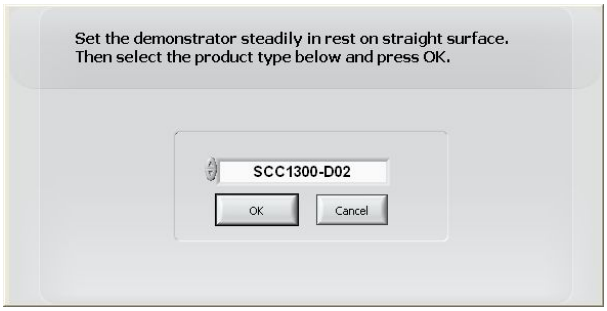

Set the demonstrator steadily in rest on straight surface.
Then select the product type below and press OK.
SCC1300-D02
OK
Cancel

Figure 4. Product selection pop-up window.

User needs to select the correct product type from **PRODUCT SELECTION** pop-up window (Figure 4). SCC1300-D02 is selected by default.

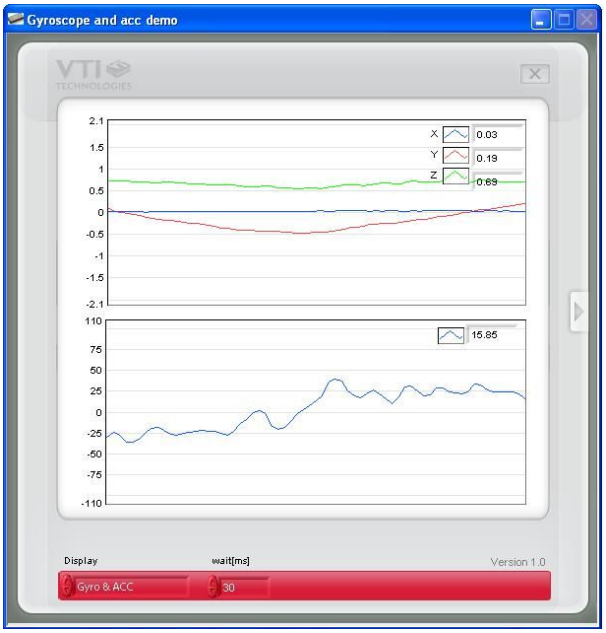


Figure 5. Gyro & ACC display.

Gyro & ACC, continuously scrolling gyro output and X, Y, Z accelerations, see Figure 5. Angular rate is presented in [°/s] and acceleration in [g]. User can:

- change the acceleration scale
- select between angular rate sensor measurement ranges 110[°/s]/300[°/s] /Manual
- select between acceleration sensor measurement ranges 2g/6g/Manual

Most of the actions/controls listed above are in the extension part of the window, which can be accessed by pressing the arrow button (see Figure **2** and Table 1).

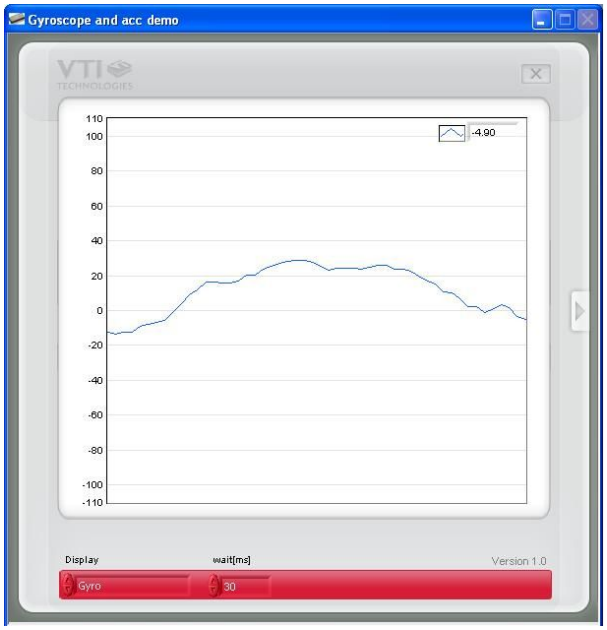


Figure 6. Gyro display.

Gyro, continuously scrolling gyro output. Angular rate is presented in [°/s].

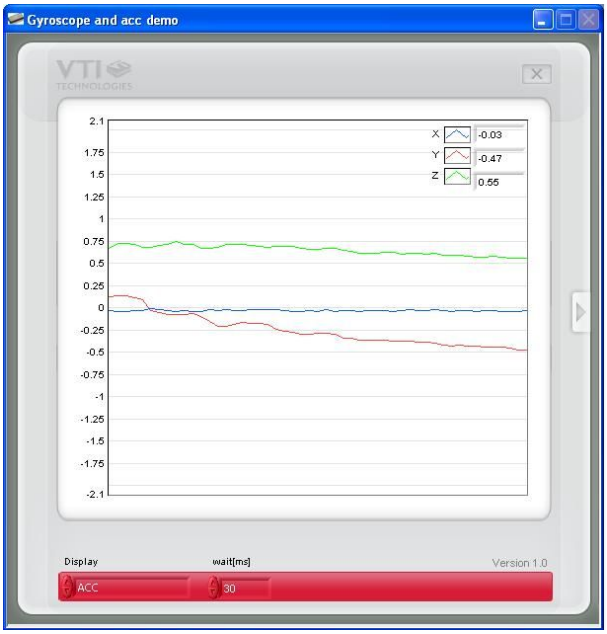


Figure 7. ACC display.

ACC, continuously scrolling X, Y and Z outputs of the accelerometer. Acceleration is presented in [g].

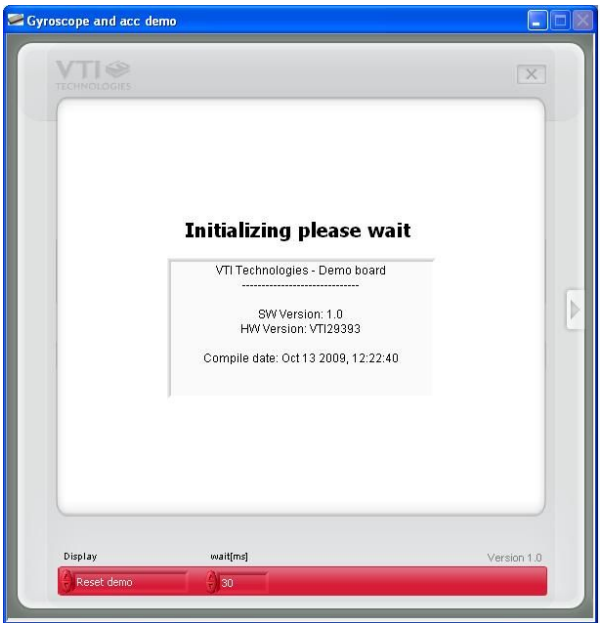


Figure 8. Reset demo display.

RESET DEMO initialises the GUI software. The embedded MCU software version is presented. Gyro & ACC display opens after RESET by default.

4.1 Resetting GUI and µC

SCC1300 Demo Kit GUI software can be reinitialised by selecting the “Reset demo” display from pull down menu, see Figure 8.

MCU can be reset by exiting from the GUI and then pressing the reset button (Figure 1) on USB interface board.

4.2 Uninstalling the GUI and USB Driver

The GUI software and the USB driver (FTDI Serial Converter Driver) can be removed from Windows Control Panel Add/Remove Programs. Please notice that removing the FTDI Serial Converter Driver (USB driver) may affect on functionality of some other programs (such as other demo kits provided by VTI Technologies).

5 Advanced data logging

Acceleration data can be saved from GUI software by pressing the “Save to file” button (
Figure **2**). Data can be logged also by using the Windows HyperTerminal software and macro language that is used to control the MCU of the SCC1300 Demo Kit.

Please notice that GUI software and Windows HyperTerminal software can not be open at the same time. Follow the steps below to start the data logging:

1. Connect SCC1300 Demo Kit with USB cable to PC
2. Open GUI software to see the correct COM port number (SETUP display, see **Error! Reference source not found.**). Windows Device Manager can also be used to find out the COM port number.
3. Close the GUI software.
4. Open Windows HyperTerminal software from CD-ROM:
   - “SCC1300_demo_HyperTerminal_connection.ht”, or
   - see detailed serial communication settings in Table 2.
5. Press demo reset button (see Figure 1). SCC1300 Demo Kit sends an info text to HyperTerminal (see Figure 9). If the HyperTerminal software is unable to connect the SCC1300 Demo Kit or the info text does not appear,
   - Press disconnect ,
   - change the COM port number to correct from port properties
   - press connect ,
   - press reset button on SCC1300 Demo Kit.

   until info text appears to HyperTerminal screen (see Figure 9).
6. After the info text appears on HyperTerminal, send the wanted macro text file, such as “SCC1300_data_logger.txt” from CD-ROM (“Transfer” pull down menu → “Send Text File…” → browse for SCC1300_data_logger_macro.txt)
7. The text file is a macro that runs in an endless loop. The macro sends angular rate and 3-axis acceleration data in hex format to HyperTerminal (see Figure 10). Example of data format:
   `0x0025,0x004c,0x0008,0x0a1c,G-X-Y-Z`
   where “0x” indicates for hex format, and “`G-Z-Y-X`” the axis order.
8. The data can be stored by capturing the data in to file:
   “Transfer” pull down menu → “Capture Text…” → save captured data into wanted file and folder.
9. Data capturing can be stopped from:
   “Transfer” pull down menu → “Capture Text…” → “Stop”

Macro language is used to control the SCC1300 DEMO KIT. It can be also used to configure the SCC1300 sensor. For more detailed information of macro language, please refer to “SCA3000 DEMO KIT macro language description 8259200”.

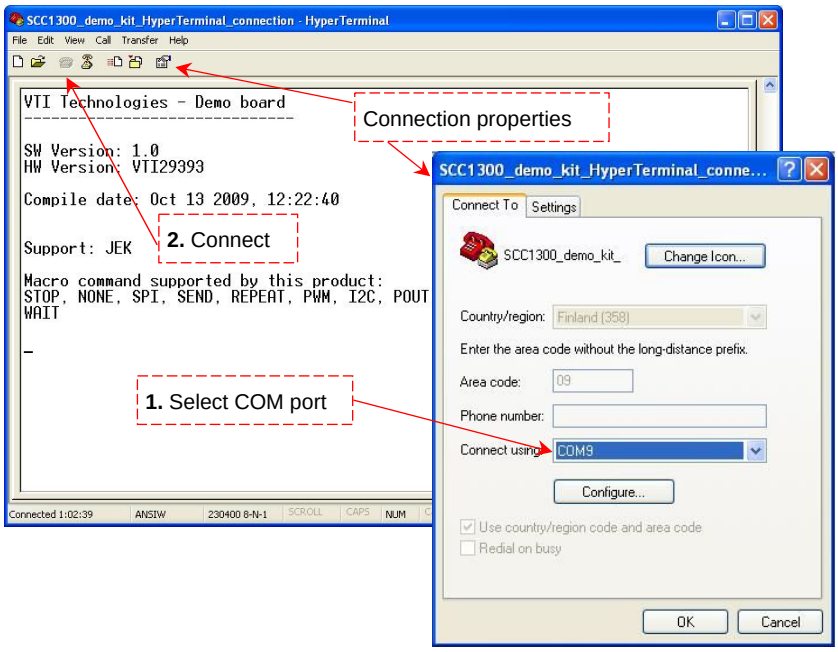


Figure 9. Windows HyperTerminal with SCC1300 demo info text.

If the pre-configured HyperTerminal connection is not available (the CD-ROM), the HyperTerminal connection can be opened also from:

→ Start → Programs → Accessories → Communications → HyperTerminal

The communication settings are presented in Table 2 below

Table 2. SCC1300 Demo Kit serial communication settings.

Parameter	Value
Bits per second	230400
Data bits	8
Parity	None
Stop bits	1
Flow control	None

The correct COM port number depends on the PC and USB port used.

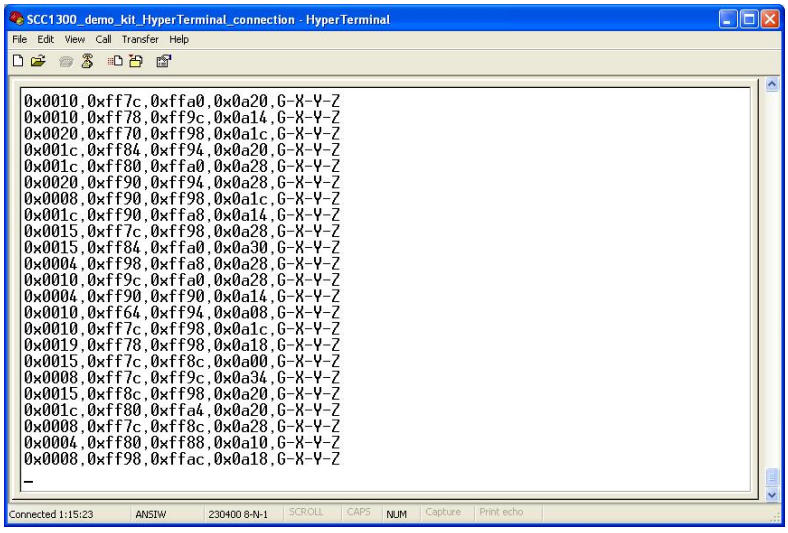


Figure 10. SCC1300 demo output during data logging.

6 USB Interface Board Circuit Diagram

SCC1300 demo USB interface board circuit diagram is presented in following pages.

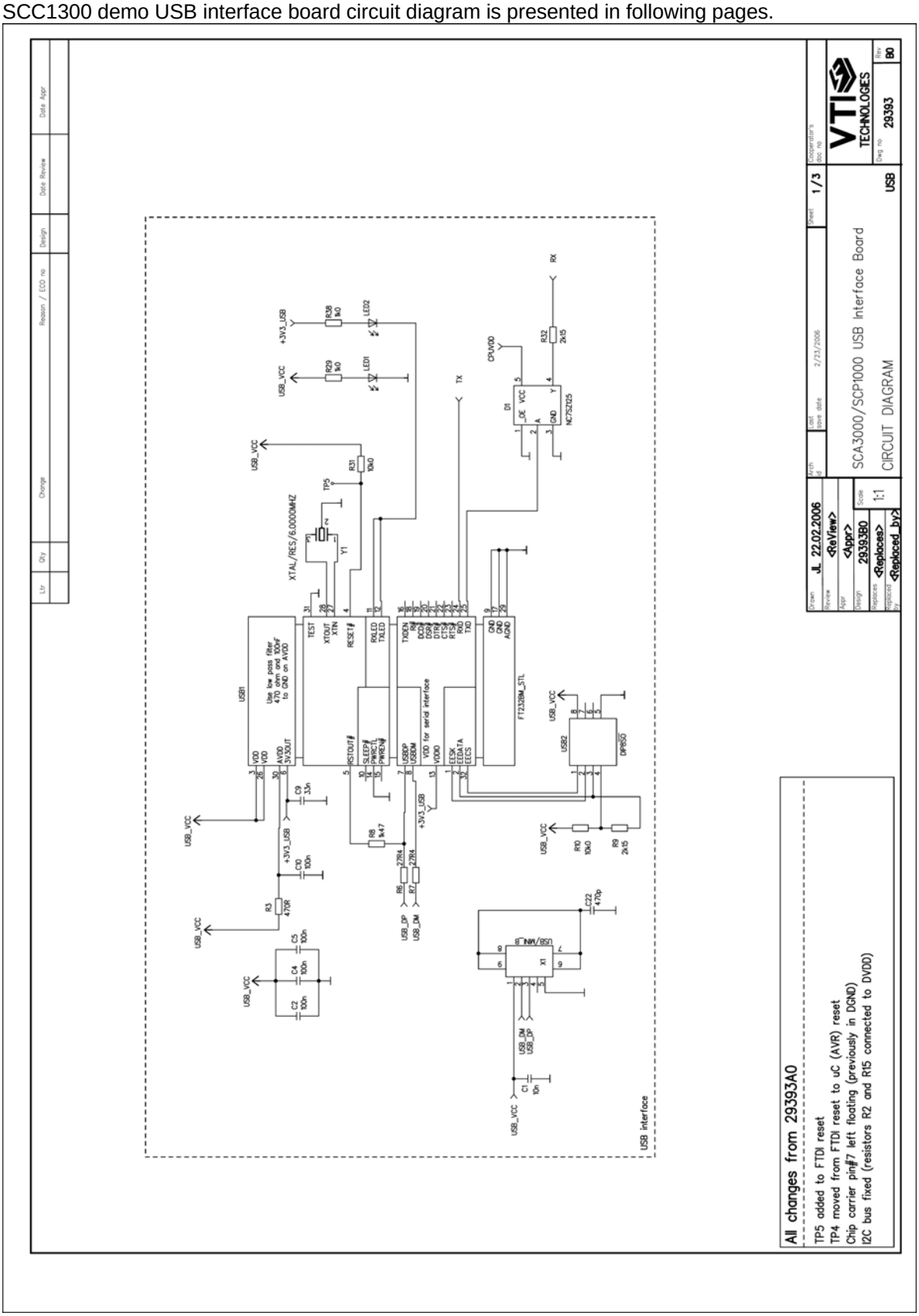


Figure 11. SCC1300 Demo Kit USB interface board circuit diagram (sheet USB).

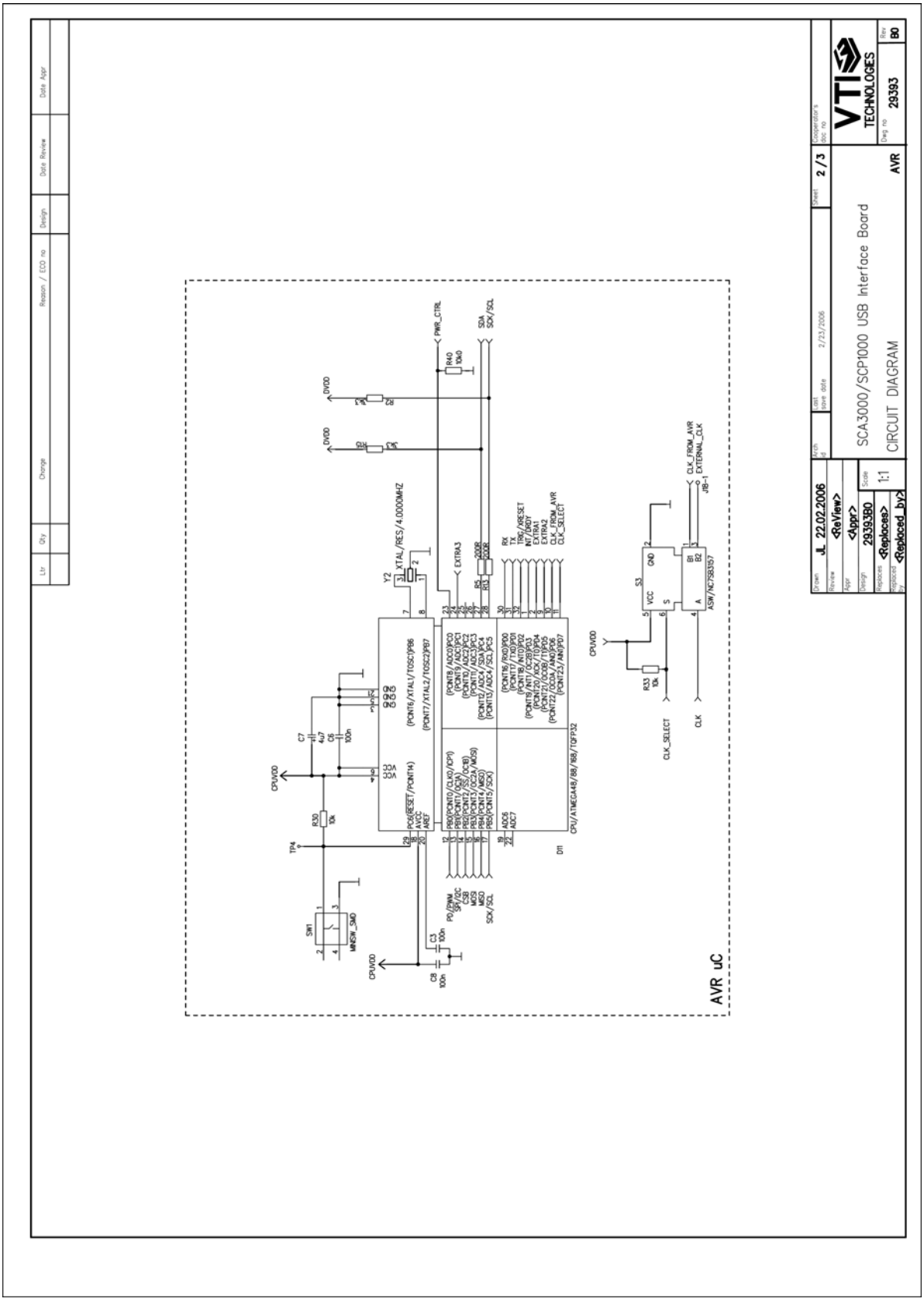


Figure 12. SCC1300 Demo Kit USB interface board circuit diagram (sheet MCU).

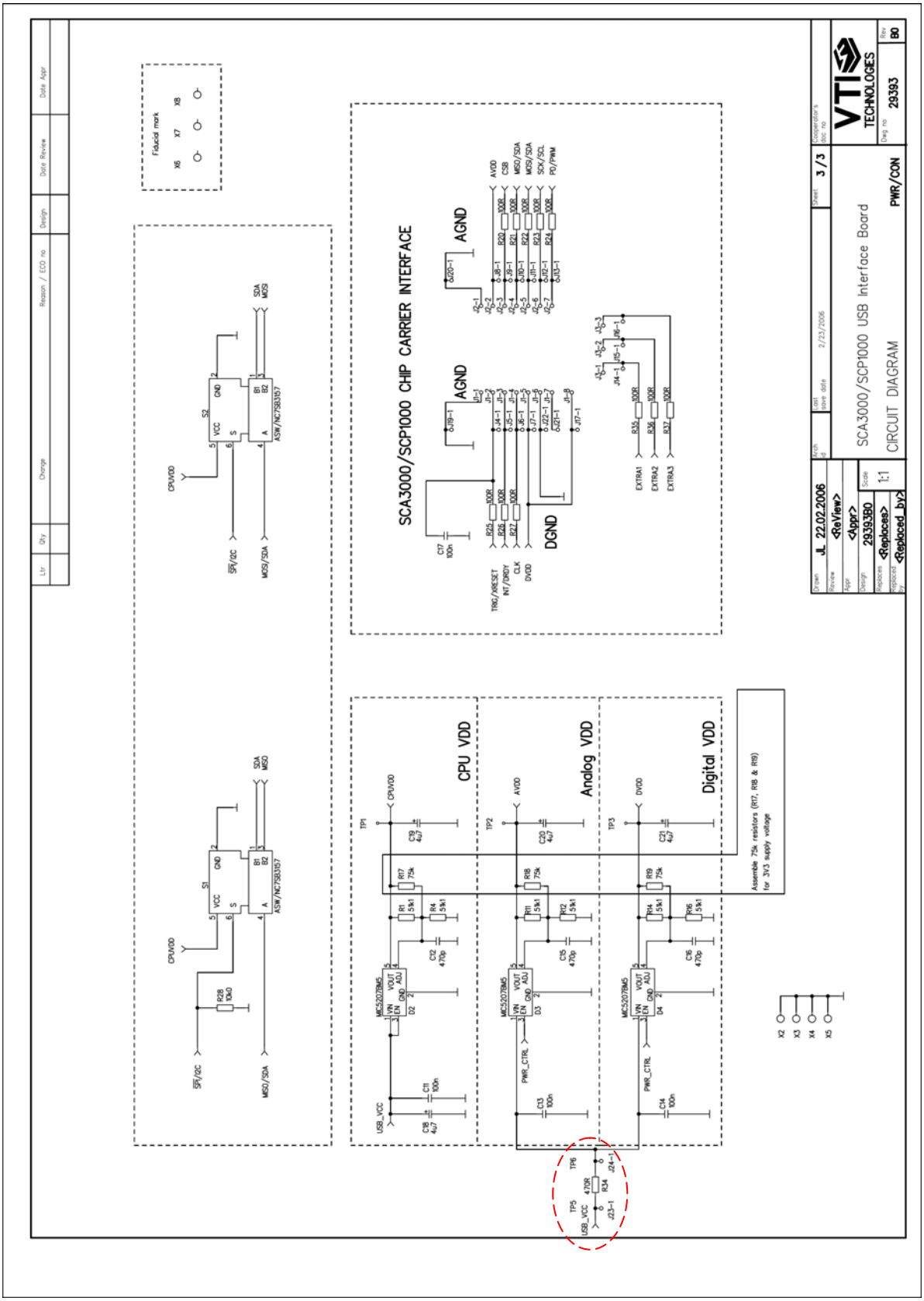


Figure 13. SCC1300 Demo Kit USB interface board circuit diagram (sheet power, resistor R34 is 0 ohm instead of 470 ohm described in the schematics).

7 USB interface board PWB layout

SCC1300 Demo Kit USB interface board PWB layout and silkscreen is presented below.

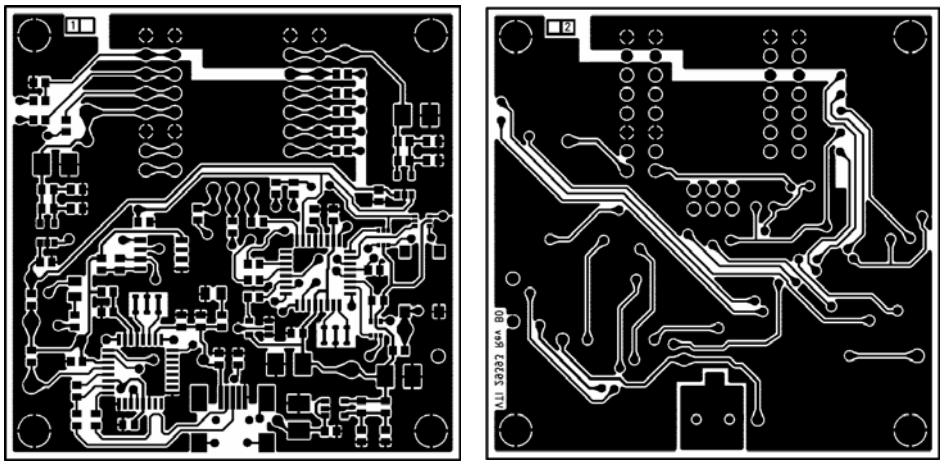


Figure 14. SCC1300 Demo Kit USB interface board PWB layout.

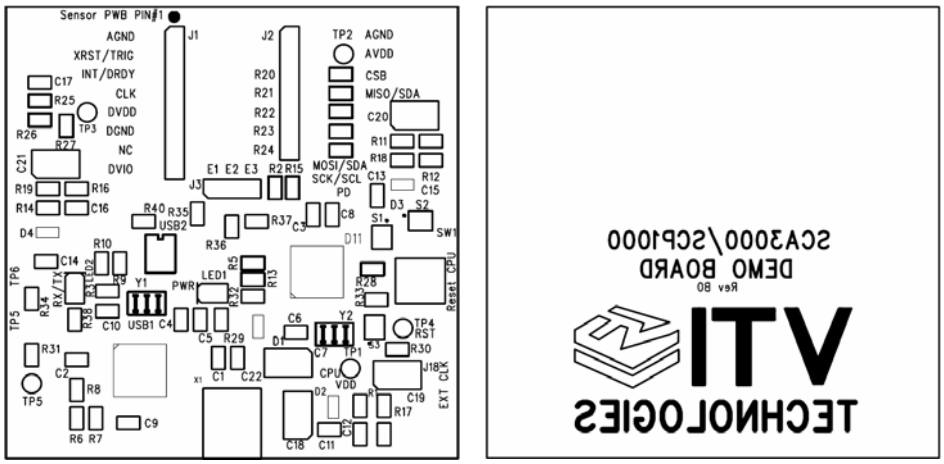


Figure 15. SCC1300 Demo Kit USB interface board silkscreen.

8 Troubleshooting

Due to many PC environments, the interoperability can be limited. The SCC1300 Demo Kit has been tested with DELL laptops (Latitude D600, D610, D620, D410) and desktop PCs with Win2000 WinXP, Vista and Windows 7 operating systems. If the SCC1300 Demo Kit does not work properly or its operation is limited, the following items may help to sort the problems out:

1. Stop the GUI software, press the reset button program on demo USB interface board (see Figure 1), re-start the GUI again.
2. SCC1300 demo may not work properly if your PC has multiple USB serial port devices installed. Please remove all other USB serial port devices (including other VTI demos).
3. Close Windows HyperTerminal software, if you have used it.
4. If the GUI interface starts, but data is not scrolling in the window, check that USB driver LATENCY TIMER parameter is 5ms, please see details in section 8.1
5. Some times other LabView based software do not allow the demo kit GUI software execution, please try to install the SCC1300 demo kit to another PC or remove other LabView based software
6. If the PC is unable to find the demo kit serial port, try another USB port. Also, please check that there are not duplicate serial COM port numbers, more details in section 8.2.
7. Test the demo with another USB cable.
8. Check that the communication between the demo kit and the PC works:
    - Open HyperTerminal connection to the demo (see section 5)
    - Press demo reset button (see Figure 1)
    - see if the info text appears on the screen (see Figure 9)

   → if the info text is transmitted, the communication between the demo kit and PC is ok

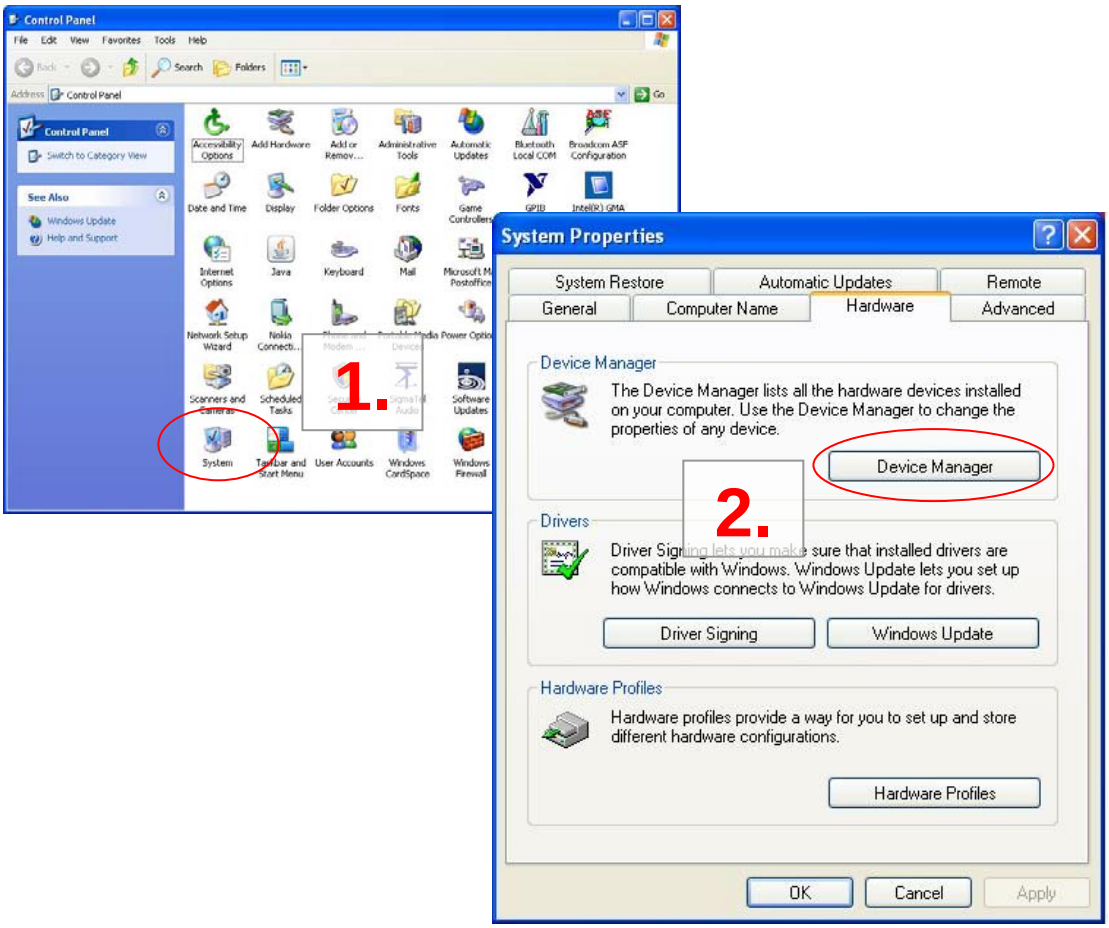
8.1 Checking and Setting Correct USB Driver Latency Timer Value

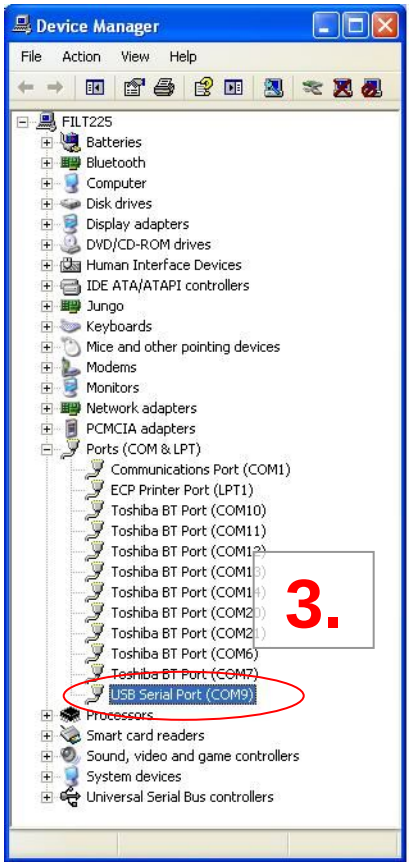
The FTDI USB Virtual Serial Com Port driver is delivered with the SCC1300 demo kit and the same driver version can be also downloaded from VTI's website.

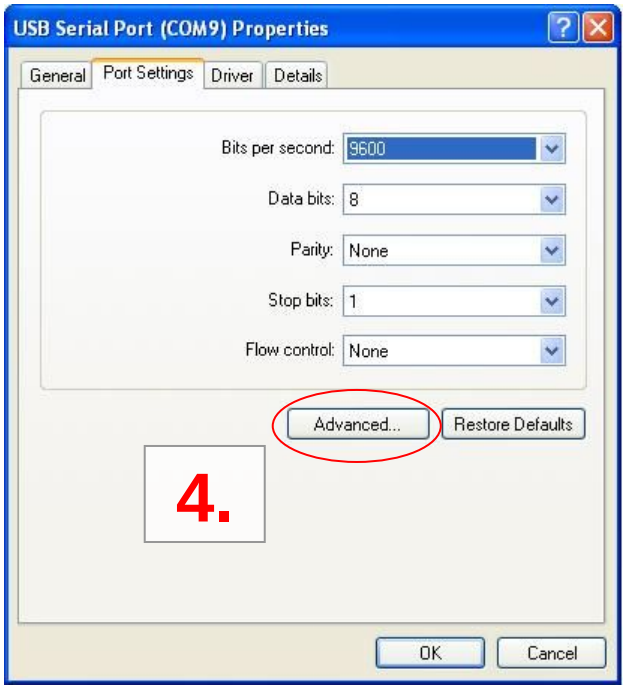
In order to modify the driver's Latency timer value, please plug the demo USB cable in to PC and follow the steps (and screen captures) below:

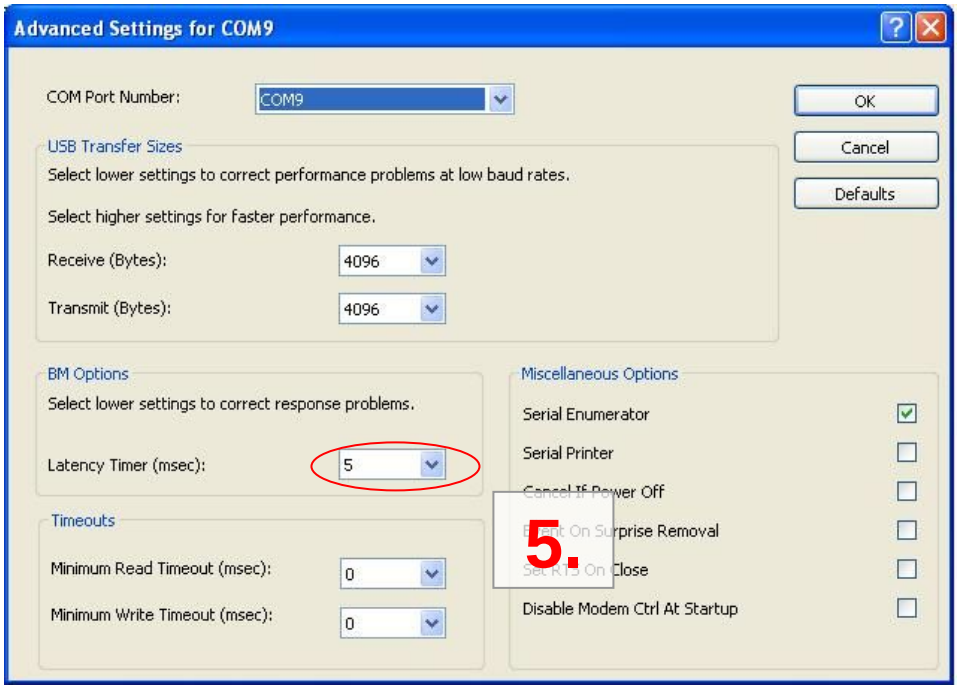
1. Open control panel and select “SYSTEM”
2. Select “DEVICE MANAGER” from “HARDWARE” tab
3. Select “USB SERIAL PORT” from the list, right mouse click and select “PROPERTIES"
4. Select “ADVANVED” from the USB Serial port Properties
5. Set the “LATENCY TIMER” to 5 ms (the 16ms default value is too slow for SCC1300 Demo Kit).
6. Press “OK” to all windows.
7. Restart the GUI software.

Start → Control panel


Control Panel
1.
System Properties
System Restore
Automatic Updates
Remote
General
Computer Name
Hardware
Advanced
Device Manager
The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.
Device Manager
2.
Drivers
Driver Signing lets you make sure that installed drivers are compatible with Windows. Windows Update lets you set up how Windows connects to Windows Update for drivers.
Driver Signing
Windows Update
Hardware Profiles
Hardware profiles provide a way for you to set up and store different hardware configurations.
Hardware Profiles
OK
Cancel
Apply


Device Manager
File Action View Help
FILT225
Batteries
Bluetooth
Computer
Disk drives
Display adapters
DVD/CD-ROM drives
Human Interface Devices
IDE ATA/ATAPI controllers
Jungo
Keyboards
Mice and other pointing devices
Modems
Monitors
Network adapters
PCMCIA adapters
Ports (COM & LPT)
Communications Port (COM1)
ECP Printer Port (LPT1)
Toshiba BT Port (COM10)
Toshiba BT Port (COM11)
Toshiba BT Port (COM12)
Toshiba BT Port (COM13)
Toshiba BT Port (COM14)
Toshiba BT Port (COM2)
Toshiba BT Port (COM3)
Toshiba BT Port (COM6)
Toshiba BT Port (COM7)
USB Serial Port (COM9)
Processors
Smart card readers
Sound, video and game controllers
System devices
Universal Serial Bus controllers
3.


USB Serial Port (COM9) Properties
General
Port Settings
Driver
Details
Bits per second: 9600
Data bits: 8
Parity: None
Stop bits: 1
Flow control: None
Advanced...
Restore Defaults
4.
OK
Cancel


Advanced Settings for COM9
COM Port Number: COM9
OK
Cancel
Defaults
USB Transfer Sizes
Select lower settings to correct performance problems at low baud rates.
Select higher settings for faster performance.
Receive (Bytes): 4096
Transmit (Bytes): 4096
BM Options
Select lower settings to correct response problems.
Latency Timer (msec): 5
Timeouts
Minimum Read Timeout (msec): 0
Minimum Write Timeout (msec): 0
Miscellaneous Options
Serial Enumerator
Serial Printer
Disable Modem Ctrl At Startup
5.

8.2 Duplicate Serial COM Port Numbers

Some PCs assign duplicate COM port numbers for virtual com port devices. If the PC assigns a COM port number for demo kit that is already reserved by another device, the demo kit will not work properly (see **Figure 16**).

COM port numbers can be seen from Computer Management (Device Manager), see section 8.1 for instructions on opening the Device Manager.

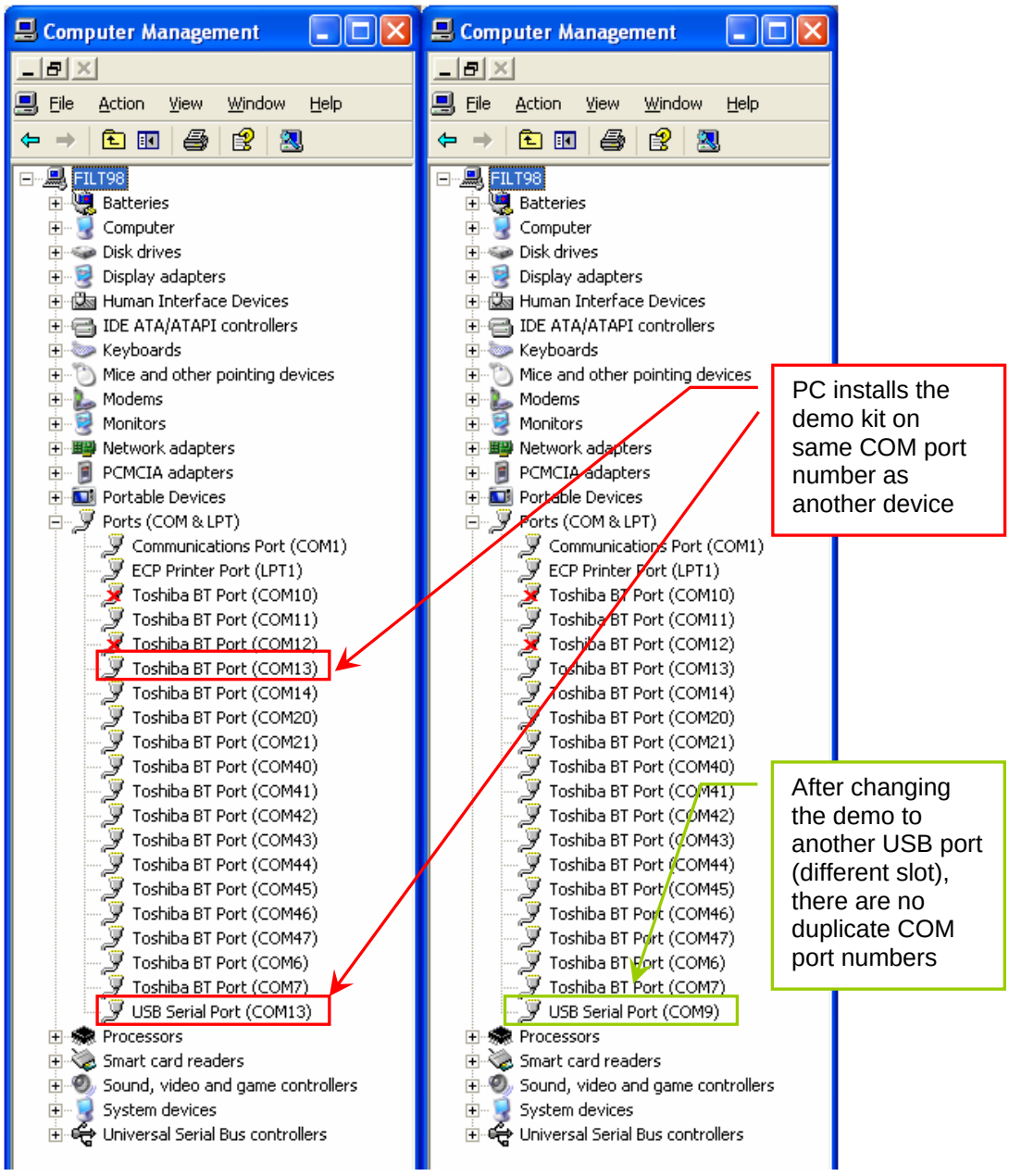


Figure 16. PC has assigned duplicate COM port numbers for two devices (LEFT), after changing the USB port there are no duplicate COM port numbers (RIGHT).

9 Document Revision History

Version	Date	Change Description
0.1	08.12.2009	Initial release

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